Æcidium on Juniperus Virginiana.[1]

W. G FARLOW.

During a visit to Bermuda in the winter of 1881 I examined the cedars, *Juniperus Bermudiana* L., which everywhere abound, in order to ascertain whether they were infested by peculiar species of Gymnosporangium. I was unsuccessful in my search and, as far as could be seen with the naked eye, the cedars were free from any species of Uredineæ. The twigs of some trees growing near Paynter Vale on Castle Harbor, however, bore roundish galls attached on one side to the twigs which resembled the distortions caused by Gym. globosum on J. Virginiana in the United States. It was only after an examination with a hand lens that insignificant spots were detected which, seen in section under a higher power, were found to be due to the presence of an æcidium. My specimens were collected in February and, at that date, the peridia hardly protruded beyond the surface of the galls, and in some cases had not opened at all. I hastily assumed that better material could be obtained later in the season and, at my request, Dr. Walter Faxon, who subsequently visited Bermuda in mid-summer, kindly sent me galls collected in July. Contrary to my expectation the fungus was not in so good a condition as in the material collected in February, and a re-examination of my own specimens convinced me that the æcidium on them was past its prime in spite of the fact that a few peridia were not open.

In the spring of the present year I received from Mr. F. S. Earle some twigs of J. Virginiana collected at Ocean Grove, Miss., in January, on which were galls not more than quarter of an inch in diameter, not more than half the size of those on J. Bermudiana and fresher, with the color of mahogany. If the galls on J. Bermudiana looked like old galls of Gym. globosum of several years' standing, those on J. Virginiana looked quite as much like the young first-year's galls of the same species. The specimens collected by Mr. Earle had æcidia essentially the same as those that I have found in Bermuda but in better condition for study, so that it

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is probable that the fungus which I consider to be the same in both cases is in perfection in December and January. Compared with other Uredineæ which grow on Coniferæ, the æcidium in question, apart from the galls which indicate its presence, is decidedly less conspicuous, and an excellent observer of plants, Mr. Wm. Peniston, who lives close to the affected trees at Paynter Vale, assured me that he had never noticed any yellow or brown fungi on the galls.

The occurrence of an æcidium on Juniperi, which produces distortions resembling those of a Gymnosporangium, has not hitherto been suspected and, as no similar form is known to me, the species may be described as follows:

ÆCIDIUM BERMUDIANUM n. sp.—Gall perennial, globose or subreniform, when young often distinctly lobed, surface at first mahogany-colored becoming darker with a honeycombed surface, $\frac{1}{4}$–$\frac{1}{2}$ inch in diameter. Æcidia minute, about .20 mm. broad, .20–.25 mm. high when mature. Peridial cells oval or elliptic, .038×.05 mm. average, surface covered with sinuous slightly raised ridges. Spores brownish, usually polygonal in outline, rarely spherical, .019–.023 mm. in diam., surface smooth or only very slightly roughened.

On the smaller branches of *Juniperus Bermudiana* and *J. Virginiana*. Winter. Bermuda *(Farlow)*. Mississippi *(Earle)*.

Whether this æcidium is connected with any Gymnosporangium is very doubtful. No species of that genus is yet known in Bermuda and the æcidia of the Gymnosporangia of the Southern United States, as determined by the cultures of Thaxter and others, are supposed to be well known Rœsteliæ growing on Pomeæ with the exception of Gym. globosum, a species in which cultures have given only negative results as yet. There are two facts, however, which would lead us to hesitate before thinking that there is a connection between Æc. Bermudianum and Gym. globosum. The latter species is very common in the Northern States on J. Virginiana, while Æc. Bermudianum is known only near the sea in the extreme South. Furthermore, in the cases which have been carefully studied, the Gymnosporangia occur in the spring and the æcidia forms come later in the season. Æc. Bermudianum, on the contrary, develops in mid-winter just before the appearance of the Gymnosporangia in the Southern States, and if we believe that the two forms are connected, we must recognize an interval of at least seven months between the disappearance of the teleutosporic form and the apearance of the æcidial form. It is more prob-

able that the present æcidium has no connection with our known Gymnosporangia, and that its other stages may very likely be traced to other Uredineæ which inhabit warmer regions near the Gulf of Mexico and the Atlantic. The resemblance of the galls in the two fungi is certainly curious.

The relation of Æc. Bermudianum to the Rœsteliæ already known in the United States is not very close. A differential diagnosis is hardly necessary, for the characters above will be recognized as sufficiently marked by those who study this group of plants. The species which in the microscopic characters of the spores and peridial cells comes nearest to the present species is *R. lacerata* Cooke, which grows on Cratægus in the Southern States. In the distortions produced, the absence of ridges on the peridial cell, and several other respects, the differences between the two are decided. It is to be hoped that observers in the field will gather more information about this curious fungus.

Insect relations of certain Asclepiads. I.

CHARLES ROBERTSON.

(WITH PLATE XII.)

ASCLEPIAS VERTICILLATA.—The gynostegium is very small, the anther wings measuring about one and two-fifths millimetres. It fastens the corpuscula almost exclusively upon the hairs of the legs of insects; and, in this respect, shows a strong contrast even with A. incarnata. While the corpuscula of the latter are sometimes found on the tips of the claws of the largest visitors, Bombus and Sphex, those of this plant are rarely found even on the claws of the smallest, Ceratina dupla, Halictus, and Cerceris compacta (?). Of ninety-two specimens bearing corpuscula, eighty-eight have them on hairs alone, and four on the hairs and claws. That is, one specimen in twenty-three has them on its claws, while about one in three of those bearing corpuscula of A. incarnata has them on its claws. As the wings increase in size in the three following species, corpuscula are attached more frequently to the claws and less often to the hairs. Eight specimens show pollinia on their tongues. There is quite a contrast between this species and A. incarnata, in respect to the formation of combinations of corpuscula. A. verticillata does not form them so readily; and, in